



Modelling the state of the Mediterranean Sea under contemporary and future climate

Cosimo Solidoro (1,2), Paolo Lazzari (1), Gianpiero Cossarini (1), Donata Melaku Canu (1), and Tomas Lovato (3)

(1) National Institute for Oceanography and Experimental Geophysics, OGS, Trieste, Italy (csolidoro@ogs.trieste.it), (2) International Centre for Theoretical Physics, ICTP, Trieste, Italy, (3) Euromediterranean Center for Climate Change, CMCC, Bologna, Italy

A validated 3D coupled transport-biogeochemical model is used to assess the impact of future climatic and management scenarios on biogeochemical and ecological properties of the Mediterranean Sea. Results are discussed in terms of temporal and spatial distribution of parameters and indicators related to the carbonate system and the cycles of carbon and inorganic nutrients through dissolved and particulate phases, as simulated by a multi nutrient multi plankton numerical model under current and future conditions. Simulations span the period 1990-2040 and are performed by forcing a three-dimensional off-line coupled eco-hydrodynamical model (BFM and OPA-tracer model) with current fields produced by ad hoc implementation of the NEMO modelling system and with river input of nutrient and freshwater computed in recent European fp7 projects.

The model properly describes available experimental information on contemporary seasonal dynamic and spatial distribution at the basin and sub-basin scale of major biogeochemical parameters, as well as primary production and carbon fluxes at the air-ocean interface.

Model projections suggest that future Mediterranean sea will be globally warmer, more productive, and more acidic, but with significant space variability.

Consequences in terms of ecological and higher trophic level organisms dynamics are discussed as well, also in reference with impact on space distribution of suitable site for aquaculture activity and future space distributions of suitability habitats for habitat building organisms (e.g. Poseidonia, Coralligenous)